

AMENDMENTS TO CLAIMS:

The listing of claims will replace all prior versions, and listings, of claims in the application:

LISTING OF CLAIMS:

1-2. (Canceled)

3. (Currently Amended) ~~An image sensor controller for controlling that controls~~ an image sensor having a light receiving section and a transfer section that receives ~~image data signals~~ from the light receiving section, the image sensor controller comprising:

a drive controller configured to supply a shift/transfer clock to the transfer section, ~~which shifts and transfers received image data, a the~~ shift/transfer clock used for shifting the data signals and transferring the ~~image data signals;~~

the shift/transfer clock being configured to have a first frequency during a first period in which a first data signal of the data signals is outputted from a dummy pixel of a plurality of pixels included in the light receiving section;

the shift/transfer clock being configured to have a second frequency during a second period in which a second data signal of the data signals is outputted from a non-reading pixel of the plurality of pixels;

the shift/transfer clock being configured to have a third frequency during a third period in which a third data signal of the data signals is outputted from a reading pixel of the plurality of pixels;

the first frequency being higher than the second frequency; and

the second frequency being higher than the third frequency.

~~wherein a reading pixel region in which image data is read, a non-reading pixel region in which image data is not read, and a dummy pixel region are defined, and~~

~~wherein the shift/transfer clock supplied by the drive controller to the transfer section has a clock frequency that is highest in a dummy pixel output period during which image data obtained from the dummy pixel region is outputted from the transfer section, next highest in a non-reading pixel output period during which image data obtained from the non-reading pixel region is outputted from the~~

~~transfer section, and lowest in a reading pixel output period during which image data obtained from the reading pixel region is outputted from the transfer section.~~

4-5. (Canceled)

6. (Currently Amended) An image sensor controller according to claim 3, wherein the drive controller includes a pattern selector configured to select, from among a plurality of clock patterns for setting the shift/transfer clock, a specific clock pattern for each period during which ~~image-the data~~ signals is-are outputted from the transfer section of the image sensor.

7. (Currently Amended) An image sensor controller according to ~~claim 4~~ claim 6, wherein;

the drive controller includes a memory configured to store the plurality of clock patterns; and

the pattern selector selects from among the plurality of clock patterns stored in the memory a specific clock pattern for each image data output period based on pattern switch timing setting information, and supplies the shift/transfer clock to the transfer section of the image sensor based on the clock pattern selected.

8. (Currently Amended) An image sensor controller according to claim 3, further comprising:

an image processing controller configured to (i) supply an A/D conversion/transfer clock to an A/D converter that converts analog ~~image-data~~ signals sent from the transfer section of the image sensor to digital ~~image-data~~ signals, and (ii) receives the digital ~~image-data~~ signals outputted from the A/D converter based on the supplied A/D conversion/transfer clock;

wherein the image processing controller invalidates ~~image-data~~ signals obtained from the dummy pixel ~~region~~ and the non-reading pixel ~~region~~ received from the A/D converter.

9. (Currently Amended) An image sensor controller according to claim 3, further comprising:

an image processing controller configured to (i) supply an A/D conversion/transfer clock to an A/D converter that converts analog ~~image-data~~ signals sent from the transfer section of the image sensor to digital ~~image-data~~ signals

signals, and (ii) receives the digital ~~image-data~~ signals outputted from the A/D converter based on the supplied A/D conversion/transfer clock,

wherein the image processing controller disables an output operation of the A/D converter during periods in which the A/D converter outputs ~~image-the data signals~~ obtained from the dummy pixel ~~region~~ and ~~the non-reading pixel-region~~.

10. (Currently Amended) An image sensor controller according to claim ~~13~~, further comprising:

an image processing controller configured to (i) supply an A/D conversion/transfer clock to an A/D converter that converts analog ~~image-data signals~~ sent from the transfer section of the image sensor to digital ~~image-data signals,~~ and (ii) receives the digital ~~image-data~~ signals outputted from the A/D converter based on the supplied A/D conversion/transfer clock,

wherein the image processing controller supplies the A/D conversion/transfer clock at a constant clock frequency, irrespective of the changes in frequency of the shift/transfer clock.

11. (Canceled)

12. (Currently Amended) An electronic device, comprising:

an image sensor that has a light receiving section and a transfer section that receives ~~image-data~~ signals from the light receiving section; and

an image sensor controller configured to control the image sensor, the image sensor controller comprising:

a drive controller configured to supply a shift/transfer clock to the transfer section, ~~which shifts and transfers received image data, a~~ the shift/transfer clock used for shifting the data signals and transferring the ~~image-data signals;~~

the shift/transfer clock being configured to have a first frequency during a first period in which a first data signal of the data signals is outputted from a dummy pixel of a plurality of pixels included in the light receiving section;

the shift/transfer clock being configured to have a second frequency during a second period in which a second data signal of the data signals is outputted from a non-reading pixel of the plurality of pixels;

the shift/transfer clock being configured to have a third frequency during a third period in which a third data signal of the data signals is outputted from a reading pixel of the plurality of pixels;

the first frequency being higher than the second frequency; and

the second frequency being higher than the third frequency.

~~wherein the shift/transfer clock supplied by the drive controller to the transfer section has a frequency that is higher in a dummy pixel output period during which image data obtained from a dummy pixel region is outputted from the transfer section than in an effective pixel output period during which image data obtained from an effective pixel region is outputted from the transfer section.~~

13. (Currently Amended) An electronic device according to claim 12, further comprising:

a carriage on which the image sensor is mounted;

a drive device configured to drive the carriage in a scanning direction; and

a servo controller configured to perform servo control on the drive device in accordance with servo control information read by the image sensor from a source.

14-15. (Canceled)

16. (Currently Amended) A method for controlling an image sensor having a light receiving section and a transfer section that receives ~~image data~~ signals from the light receiving section, the method comprising:

controlling the frequency of a shift/transfer clock for shifting the data signals and transferring the image data signals by:

setting the frequency of the shift/transfer clock to a first frequency in a dummy pixel output period during which ~~image a first data~~ signal obtained from a dummy pixel region is outputted from the transfer section;

setting the frequency of the shift/transfer clock to a second frequency in a non-reading pixel output period during which a second image data signal obtained from a non-reading pixel region is outputted from the transfer section;
and

setting the frequency of the shift/transfer clock to a third frequency in a reading pixel output period during which a third image data signal obtained from a reading pixel region is outputted from the transfer section;

the first frequency being higher than the second frequency; and
the second frequency being higher than the third frequency; and

supplying the shift/transfer clock to the transfer section which shifts and transfers received image data signals based on the frequency of the shift/transfer clock.

17-18. (Canceled)

19. (Currently Amended) A method according to claim 16, further comprising selecting, from among a plurality of clock patterns for setting the shift/transfer clock, a specific clock pattern for each period during which ~~image-the~~ data signals are is-outputted from the transfer section of the image sensor.

20. (New) An electronic device according to claim 12,

wherein the transfer section transfer the ~~image-third~~ data signal of the reading pixel region at a first transfer rate, and transfer the ~~image-second~~ data signal of the non-reading pixel region at a second transfer rate, which is faster than the first transfer rate, and transfer the ~~image-first~~ data signal of the dummy pixel region at a third transfer rate, which is faster than the second transfer rate.

21. (New) An image sensor comprising:

a light receiving section; and

a transfer section that receives data signals from the light receiving section and transfer the image data signals,

wherein the transfer section transfer the data signals of a reading pixel region at a first transfer rate, and transfer the data signals of a non-reading pixel region at a second transfer rate, which is faster than the first transfer rate, and transfer the data signals of a dummy pixel region at a third transfer rate, which is faster than the second transfer rate.

22. (New) An image sensor controller that controls an image sensor having a light receiving section and a transfer section receiving data signals from the light receiving section, the image sensor controller comprising:

a drive controller configured to supply a shift/transfer clock to the transfer section, the shift/transfer clock being used for shifting the data signals and transferring the data signals,

the shift/transfer clock being configured to have a first frequency during a first period in which a first data signal of the data signals is outputted from a first pixel of a plurality of pixels included in the light receiving section,

the shift/transfer clock being configured to have a second frequency during a second period in which a second data signal of the data signals is outputted from a second pixel of the plurality of pixels, and

the shift/transfer clock being configured to have a third frequency during a third period in which a third data signal of the data signals is outputted from a third pixel of the plurality of pixels,

the first data signal being outputted before the second data signal,

the second data signal being outputted before the third data signal,

the first frequency being higher than the second frequency, and

the second frequency being higher than the third frequency.

23. (New) An image sensor controller according to claim 20

the first pixel being a dummy pixel,

the second pixel being a non-reading pixel, and

the third pixel being a reading pixel.

24. (New) An image sensor controller that controls an image sensor having a light receiving section and a transfer section receiving data signals from the light receiving section, the image sensor controller comprising:

a drive controller configured to supply a shift/transfer clock to the transfer section, the shift/transfer clock being used for shifting the data signals and transferring the data signals;

the shift/transfer clock being configured to have a first frequency during a first period in which a first data signal of the data signals is outputted from a first pixel of a plurality of pixels that are arranged in one line of the light receiving section;

the shift/transfer clock being configured to have a second frequency during a second period in which a second data signal of the data signals is outputted from a second pixel of the plurality of pixels;

the shift/transfer clock being configured to have a third frequency during a third period in which a third data signal of the data signals is outputted from a third pixel of the plurality of pixels;

the first data signal being outputted before the second data signal;

the second data signal being outputted before the third data signal;

the first frequency being higher than the second frequency; and

the second frequency being higher than the third frequency.

25. (New) An image sensor controller that controls an image sensor, the image sensor controller comprising:

a drive controller configured to supply a transfer clock and a shift signal to the image sensor, the transfer clock being used for transferring the data signals;

the transfer clock being configured to have a first frequency during a first period in which a first data signal of the data signals outputted from a first pixel of a plurality of pixels included in the light receiving section is transferred;

the transfer clock being configured to have a second frequency during a second period in which a second data signal of the data signals outputted from a second pixel of the plurality of pixels is transferred;

the transfer clock being configured to have a third frequency during a third period in which a third data signal of the data signals outputted from a third pixel of the plurality of pixels is transferred;

the first frequency being higher than the second frequency;

the first data signal being transferred before the second data signal;

the second data signal being transferred before the third data signal;

the first data signal, the second data signal, and the third data signal being transferred during at least a part of a fourth period between a first pulse of a shift signal to a second pulse next to the first pulse of the shift signal.

26. (New) An image sensor controller according to claim 25, wherein the second frequency being higher than the third frequency.

27. (New) An image sensor controller that controls an image sensor, the image sensor controller comprising:

a drive controller configured to supply a transfer clock and a shift signal to the image sensor, the transfer clock being used for transferring the data signals;

the transfer clock being configured to have a first frequency during a first period in which a first data signal of the data signals outputted from a first pixel of a plurality of pixels included in the light receiving section is transferred;

the transfer clock being configured to have a second frequency during a second period in which a second data signal of the data signals outputted from a second pixel of the plurality of pixels is transferred;

the transfer clock being configured to have a third frequency during a third period in which a third data signal of the data signals outputted from a third pixel of the plurality of pixels is transferred;

the first frequency being higher than the second frequency;

the first data signal being transferred before the second data signal;

the second data signal being transferred before the third data signal;

the first data signal, the second data signal, and the third data signal being transferred during at least a part of a fourth period between a first timing that a shift signal changes from a first level to a second level and a second timing that a shift signal changes from the first level to the second level next to the first timing.